UCRL-ID-143148
NIF-0063546
NWBS N M 6.6

NIF
Inert Gas/Vacuum Management Prestart Review
Phase 3 - Permit Spatial Filter Vacuum

March 2001

Signatures

The Committee for the Inert Gas/Vacuum Management Prestart Review for the Phase 3-Permit Spatial Filter Vacuum

_____
Jeffrey D. Williams, Chairman

_____
Terry Bevers, Member

_____
Steve Bryan, Member

_____
Glenn Hermes, Member

_____
Howard Patton, Member

Findings approved by:

_____
Greg Tietbohl, APM for Operations

TABLE OF CONTENTS

1.0 Executive Summary

A Management Prestart Review (MPR) for the National Ignition Facility (NIF) vacuum testing of spatial filters, the Cavity Spatial Filter (CSF) and the Transport Spatial Filter (TSF), was conducted during March 2001. The review was performed to determine the readiness of the Beamline Infrastucture System (BIS) team and the Integration Management and Installation (IMI) contractor to start the vacuum testing of the components and assemblies that constitute the four CSF clusters and four TSF clusters in the NIF laser. This review assures that appropriate engineering, planning and management is in place to start this testing. Completion and acceptance of this report satisfies the LLNL requirement for MPRs to be conducted whenever a significant new risk is introduced into a project and is an essential part of the ISM work authorization process.

This MPR provides to the NIF Project Manager an independent, systematic assessment of:

- Readiness of line management to start vacuum testing.
- Completeness of planning for this testing.
- Readiness of personnel to conduct this testing.
- Hazards inherent in this testing and implementation of prevention and mitigation activities to minimize the chance of injuries and damage to equipment and facilities during this testing.

Due to the fact that this MPR was conducted approximately three months in advance of the actual start of the vacuum testing, there are, as expected, a number of activities yet to be conducted that will have influence over subsequent tests. For instance, the results of the first series of subassembly vacuum tests are required to proceed with the following series. Because of this, there are “hold points” in the test plan, which will require a “go forward” decision based on the results of the first tests. As a result, the committee is not able to review every criterion for completeness at the time of the MPR. This review identified 13 findings related to management, organization, planning, or preparation that preclude the start of vacuum testing of the spatial filters (“Type A” findings). Criteria should be reviewed at the test plan “hold points” by the Project Manager or his designee to assure that the project team is ready to proceed with follow-on tests. The MPR Committee recommends that the BIS team and IMI contractor be authorized to proceed with the vacuum testing of the CSFs and TSFs, contingent upon successful resolution of the findings.

2.0 INTRODUCTION

2.1 BACKGROUND

The TSF and CSF are vacuum enclosures consisting of assemblies of interconnected vacuum vessels, tubes, and associated connection hardware that are a critical part of generating and transporting the 192 NIF laser beams in the NIF Laser Bays. There are four CSF clusters and four TSF clusters in the NIF laser, two of each type per Laser Bay. The mechanical configuration of these systems is documented in the top level installation drawings AAA97-111148 (CSF) and AAA97-111149 (TSF) (Appendix 7.1). There are about 2000 individual fabricated components in these eight enclosures, not counting bolts, fasteners, and gaskets, with a combined weight exceeding 2000 tons. The fabricated components, such as end vessels, center vessels, and beam tubes were inspected and vacuum leak checked as individual parts at their respective vendors prior to final cleaning and assembly.

2.2 PURPOSE OF THIS MPR

This MPR was conducted because the assembly of these components into the large and complex spatial filter assemblies introduces new risk associated with damage to the components, hazard to the personnel doing the vacuum test, and schedule impact should a failure during the vacuum test result in the contamination of or damage to any components. The assembly and test of the CSF will take place 12 feet and higher above the Laser Bay floor level. The assembly and test of the TSF will take place 19 feet and higher above the Laser Bay floor level. During the course of these tests, the components will be subject to loads resulting from a slight pressurization, a full evacuation, and stresses induced as a result of hoisting and bolting the components into place.

2.3 SCOPE OF THIS MPR

The objectives of this review was to verify that all applicable design, management, organization, planning, traininG, and preparation steps have been conceived and executed in a manner consistent with the ISM process and good engineering practices. The Letter of Appointment of this MPR committee specifically required focus on (1) the leak test plan and procedures, (2) proposed implementation of the Construction Safety Program 2000 and subordinate safety plans, (3) engineering Safety Notes and/or engineering analysis, (5) measuring instrument calibration plans, and (6) personnel training and qualification plans. The N.L.1.2 NWBS organization within BIS is solely responsible for the design and fabrication of these systems and the management of the CSP 16 contractor conducting the vacuum tests. The vacuum tests will be conducted in four phases.

1. “Columns” of beam tubes will be connected together at the Laser Bay floor level and checked for vacuum tightness.

2. Columns will be hoisted and attached to the end vessels and checked for vacuum integrity of the connections to the end vessels.
3. Columns will be attached to the center vessel using the connector tubes and will be checked as bundles of eight beamlines.
4. All connectionS will be completed from end vessel to end vessel and will be leak checked as full spatial filter bundles.

2.4 Review Criteria

The MPR committee identified applicable review items from the list given in NIF Procedure 9.3, *Management Prestart Review*. This resulted in the identification of 51 items or groups of items to be reviewed for this MPR, shown in Appendix 7.3. The criteria for the successful passing of this review vary in detail from item to item. Generally, the MPR committee identified all requirements from NIF or LLNL policy and practice, from NIF System Design Requirements (SDRs) and Subsystem Design Requirements (SSDRs), from specifications generated for procurement of components, and from specifications generated to define the scope, methods, and requirements of the vacuum tests covered by this MPR. The committee considers the achievement of these requirements and specifications to be the criteria by which readiness to proceed is measured.

2.5 Review Approach

The details of the approach vary from review item to review item. Generally, the MPR committee: (1) examined documents and records relevant to verifying that the criteria are met; (2) interviewed personnel with current and historical knowledge of the design, plan, and specifications for the vessels; and vacuum test of those vessels; and (3) performed walkdowns, inspections, and observation of activities as appropriate to verify that documentation and intent were consistent with actions taken.

3.0 MPR RESULTS

3.1 FACILITY, SAFETY SYSTEMS, EQUIPMENT, AND HARDWARE

Engineering Safety Notes, Design Review action items, Non-conformance Reports (NCRS), Engineering Change Records (ECRs), test data, and inspection results were reviewed for the equipment and hardware needed for the vacuum testing. The review of ECRs indicated that there have been no significant unanalyzed design changes that would compromise safety. The vacuum tests present very low risk of failure to the equipment that comprises the vacuum envelope of the CSF and TSF. All the components have been analyzed, and all except the blank-off plates and survey mirror windows have previously been vacuum tested at the vendors, prior to final cleaning. The blank-off plates used only for this test are simple aluminum covers that have been analyzed and conservatively and conventionally designed and so also present low risk of failure during vacuum testing. The highest risk components are the survey window assemblies which have also been carefully analyzed and for which a first article vacuum test has been completed. A safety note (MESN-01-034) is in development for the survey windows, and will be completed prior to performing the tests. The consequence of failure of one of these components is the contamination of the immediate evacuated volume with broken glass from the survey window. The window itself is small (about 150 mm × 75 mm × 12 mm thick), so failure should not present significant personnel hazard or the likelihood of damage to other components. Several pieces of equipment to be used in the tests still require calibration. The actual execution of the tests is several months away, which gives ample opportunity to complete the calibration.

3.2 MANAGEMENT CONTROLS

Core management processes for this work are defined in the NIF Project Control Manual, the Construction Safety Program for the National Ignition Facility, September 2000, Jacobs IMI Project Management Plan, and in the Specifications of the Construction Subcontract Package #16 (CSP-16) “Installation of the Laser Beampath Enclosures,” NIF-5002441. These documents form a complete set of management controls to manage this work safely and correctly. Specific Management Controls developed for this work are:

1) Requirements of Construction Safety Program and associated procedures provide the requirements for safe performance of work. A draft Job Hazard analysis has been developed. The Safe Plans of Action are prepared daily on the day of the work. Requirements for safe rigging and lifts are also identified in the Construction Safety Program and in the CSP 16 Specification. Rigging plans and lifting fixtures have not yet been fully developed. Additional safety

analysis and planing are built in to the TSF and CSF Assembly Procedures and into the draft vacuum leak check test plans.

2) Jacobs Procedure IMI -9.2 Preparation of Commissioning Test Procedures provides a guide to the content of test plans. The content and form of this guidance is also consistent with the requirements of the CSP 16 Specifications (NIF-5002441). A set of draft vacuum leak test plans have been prepared for review by the BIS CSP-16 Lead Engineer. These plans identify key methods, technical criteria, required staff and training requirements, and management oversight and authorization requirements. These plans and procedures are still incomplete.

3) The CSP-16 Specification explicitly addresses the content of the TSF and CSF Assembly procedures. These procedures have been developed by Jacobs and meet the requirement of the specification. Generally, they provide step-by-step assembly instructions with associated check-off, data recording, QA, and Management oversight. Safety and quality are specifically addressed. Only minor deficiencies in these procedures have been identified.

3.3 PERSONNEL

Jacobs Procedure 9.4 Training and Qualification of Commissioning Tests, and the CSP-16 Specification (NIF-5002441) identify the training and qualification process for the Vacuum Leak Test activity. A “Leak Test Personnel Qualification and Certification Practice for JFI and NIF” has been developed. These plans form a strong basis to provide training for the personnel to conduct the activity safely and correctly. Acquisition of the required staff has yet to be completed and the required training accomplished. As the actual execution of the leak test is approximately 3–4 months away; this training must be accomplished before the test.

4.0 FINDINGS

4.1 TYPE A FINDINGS

The MPR committee found 13 Type A findings that must be addressed before BIS and the IMI contractor can be authorized to proceed with the vacuum test. These findings have been entered into the PICS tracking system, per the table below.

PICS #	NIF-PICS Title	Responsible Organization
2001-0247	Beamline Vacuum MPR: Safety Documents	BIS
2001-0248	Beamline Vacuum MPR: Torque Wrench Calibration	BIS
2001-0249	Beamline Vacuum MPR: MSLD Calibration	BIS
2001-0250	Beamline Vacuum MPR: Pressure Gauge Calibration	BIS
2001-0251	Beamline Vacuum MPR: Pressure Relief Device Calibration	BIS
2001-0252	Beamline Vacuum MPR: Capacitance Manometer Calibration	BIS
2001-0254	Beamline Vacuum MPR: Expected Failure Modes/Impact	BIS
2001-0255	Beamline Vacuum MPR: Test Plan and Procedures	BIS
2001-0256	Beamline Vacuum MPR: Cleanliness Control Plan	BIS
2001-0257	Beamline Vacuum MPR: Training Requirements	BIS
2001-0258	Beamline Vacuum MPR: Staffing Plan	BIS
2001-0261	Beamline Vacuum MPR: Installation Plan and Procedures	BIS
2001-0263	Beamline Vacuum MPR: Window Safety Note	BIS

4.2 TYPE B FINDINGS

The MPR committee found four Type B findings that must be tracked to resolution, but do not preclude the authorization to proceed with the vacuum test. These findings have been entered into the PICS tracking system, per the table below.

PICS #	NIF-PICS Title	Responsible Organization
2001-0253	Beamline Vacuum MPR: ECRs on Drawings	BIS
2001-0262	Beamline Vacuum MPR: Safety Note Assumptions	CO
2001-0265	Beamline Vacuum MPR: Cleanliness Deviations	BIS
2001-0266	Beamline Vacuum MPR: Survey Data Deviations	BIS

5.0 RECOMMENDATION

The MPR committee recommends that BIS and the IMI contractor be authorized to proceed with the spatial filter vacuum test, once all Type A findings have been resolved.

6.0 LESSONS LEARNED FROM MPR PROCESS

As the Project will be performing numerous Management Prestart Reviews over the next few years, it is important to learn from our experiences and continually improve the MPR process. Below are listed opportunities for improvement for future MPRs:

- In some instances it was difficult to find documentation related to relevant problems that had occurred in the past. Consequently, the review had to rely on personnel interviews and individual recollections, rather than on documentation. Over the past year, the Project has launched PICS for problem reporting and action tracking. Broader utilization of PICS for problem reporting will facilitate reviews conducted as part of future MPRs.
- It was difficult to gather all the documentation for all relevant NCRs. The review team expended substantial additional effort tracking down all relevant NCRs. In future, PICS should serve as the central repository for NCRs.
- Establish the MPR committee early. For future MPRs, it would be wise to establish the MPR committees well in advance of the MPR completion date (9–12 months). The committee can then establish a clear set of deliverables for those contributing to the MPR. A schedule for delivering review items can be developed Then expectations are clear, and both those providing inputs and those reviewing them, can more efficiently work towards completing the MPR.
- The MPR should not be conducted too far in advance of the actual work. Even when the preparations for the work are on schedule, they may not be ready several months ahead of time for the MPR committee to review. This supports the previous comment. Early establishment of the MPR committee allows early clarification of what needs to be reviewed during the MPR. Then, this can be assessed with respect to the work schedule, and an optimized input delivery-review schedule can be developed.
- The MPR plan should be continually referenced during the MPR activity so that MPR scope creep does not occur.

7.0 Appendices

7.1 Top level drawing of CSF and TSF

7.2 BIS and CSP 16 management

7.3 List of review items

7.4 Review item assessments

7.5 PICS action item records

APPENDIX 7.1 TOP LEVEL DRAWINGS OF CSF AND TSF

APPENDIX 7.2 BIS AND CSP 16 MANAGEMENT

As of March 25, 2001, the following people hold these positions in the LLNL and Jacobs Facilities Inc. (JFI) vacuum test line management chains.

For LLNL:

NIF Project Manager - Ed Moses

BIS Associate Project Manager - Jeff Atherton

BIS Engineering Manager - Jeff Hockman

BIS L100 Main Laser System Lead Engineer - Bill Collins

For JFI:

JFI Project Director - Steven Pearson (reports to the BIS APM for the IMI contract)

Commissioning Manager - Jerre Morton

Critical Systems Engineer - Brad Shaw

APPENDIX 7.3 LIST OF REVIEW ITEMS

	MPR Topic	MPR Committee Member	Primary Contact
1.0	Quality level and quality strategy	Jeff Williams	Clarence Dun
2.0	Critical requirements (Base pressure, leak rate, cleanliness level, pumpdown speed)	Steve Bryan	Bill Collins
3.0	Critical requirements verified	Steve Bryan	Mark Jackson
4.0	Safety Documents (General hazards of vessels and assemblies, hazards associated with installation, hazards associated with test)	Terry Bevers / Glenn Hermes	Bill Collins / Vaughn Draggoo
4.1	Engineering safety notes	Terry Bevers / Bob Murray	Dave Hipple/Bill Collins
4.2	Safety procedures	Terry Bevers / Glenn Hermes	Vaughn Draggoo
4.2.1	JHA's & SPA's	Terry Bevers / Glenn Hermes	Vaughn Draggoo
4.2.2	Special clothing, safety equipment, warning signs required for operations/ maintenance identified and available/in-place	Terry Bevers / Glenn Hermes	Vaughn Draggoo
4.3	Safety Basis (Preliminary Hazard Analysis, Hazard Analysis Report, Safety Analysis Report)	Glenn Hermes	Sandra Brereton
5.0	Critical design review action items	Jeff Williams	Bill Collins
6.0	Critical NCR close-out	Terry Bevers	Bill Collins
7.0	Critical test data and inspection results (certifications, vendor data, seismic restraints for Q1 and Q2 items, software test results and closeout of "urgent" software test incidents)	Steve Bryan / Jeff Williams	Bill Collins / Dwight Lang / Clarence Dun
8.0	Critical calibration data or calibration plans	Terry Bevers	Vaughn Draggoo
9.0	Up to date red lined drawings	Jeff Williams	Bill Collins
10.0	Expected failure modes (vacuum loss, water leak, short to ground, etc.)	Glenn Hermes	Bill Collins / Vaughn Draggoo
10.1	Repair shutdown requirements (adjacent systems, alignment lasers, venting, etc.)	Steve Bryan	Vaughn Draggoo
10.2	Repair plans for high-impact failures	Steve Bryan	Vaughn Draggoo
11.0	Installation plan and procedures	Glenn Hermes	Vaughn Draggoo / Mike Smith
12.0	Test plans and procedures	Glenn Hermes	Vaughn Draggoo
13.0	Software test plan and procedures	Glenn Hermes	Vaughn Draggoo
14.0	Commissioning plan and procedures	N/A	N/A
15.0	Cleanliness control plan (for assembly, tests, repairs)	Glenn Hermes	Vaughn Draggoo
16.0	Operations Plan and procedures (start-up, operating, emergency, software manuals)	N/A	Sandra Brereton

	(drafts ok)		
17.0	Training requirements and verification (training documented with qual cards)	Glenn Hermes	Sandra Brereton
18.0	Critical Maintenance plan and procedure (including for software, drafts ok)	Glenn Hermes	Sandra Brereton
19.0	Staffing plan and associated schedule	Glenn Hermes	Sandra Brereton
20.0	Environmental (Permits)	N/A	Sandra Brereton
20.1	Effluent monitoring system	N/A	Sandra Brereton
20.2	Environmental documentation	N/A	Sandra Brereton
20.3	Permits	N/A	Sandra Brereton
21.0	Other requirements and design specifications	Steve Bryan	
22.0	Other NCR closeout	Terry Bevers	
23.0	Other design review action items	Jeff Williams	
24.0	Supporting analysis	Terry Bevers	
24.1	Engineering calculations, seismic calculations, etc.	Jeff Williams / Terry Bevers	
25.0	Final drawings complete	N/A	Sandra Brereton
26.0	Maintenance plan and procedure (final), flow charts (logic & process)	N/A	Sandra Brereton
27.0	Operations Plan and procedures (start-up, operating, emergency) (final)	N/A	Sandra Brereton
27.1	Chemtrack in place	N/A	Sandra Brereton
27.2	Flow charts (logic & process)	N/A	Sandra Brereton
28.0	Assembly/Refurbishment Plan	N/A	Sandra Brereton
28.1	Flow charts (logic & process)	N/A	Sandra Brereton
28.2	Manufacturer's manuals or literature, other vendor submittals	N/A	Sandra Brereton
28.3	Replacement procedures	N/A	Sandra Brereton
28.4	Repair procedures	N/A	Sandra Brereton
28.5	Spares inventory & location (mech., elec., optical)	N/A	Sandra Brereton
28.6	Target chamber diagnostic construction guidelines	N/A	Sandra Brereton
29.0	Fire Protection and Life Safety (sprinklers, emergency page, egress, lighting, etc.)	N/A	Sandra Brereton
30.0	Facility utilities (HVAC, cleanliness, electrical power, emergency power, phones, building page, etc.)	N/A	Sandra Brereton
31.0	Control and Logistic Systems (PLC's, ICCS, ERP's (Glovia), PDMS (Sherpa), etc.	N/A	Sandra Brereton

APPENDIX 7.4 REVIEW ITEM ASSESSMENTS

Review Item: **1.0 Quality levels and quality strategy**	**Review Date:3/25/01** **Reviewed by: Jeff Williams** **FSD: N.L.1.2.2, N.L.1.2.4** **Page:1 of 2**

Criterion Met? Yes: X No:

Criterion:

1) Quality levels were appropriately assigned to the CSF and TSF systems
2) A quality strategy was developed that mitigated risks identified
3) The quality strategy was implemented

Approach:

1) Documents and records review.(NIF Q-level assignment form required by NIF procedure 1.6, NIF Quality Strategy form required by NIF procedure 1.6, QA records required by strategy)
2) Personnel interviews. (Bill Collins, lead engineer, Clarence Dun, NIF QA manager.)
3) Walk-downs, inspections, observations of activities. (N.A.)

Discussion of Results and Conclusion:

a) Quality levels assignments were evaluated by the NIF QA manager (Clarence Dun), the BIS Associate Project Manager (Jeff Atherton) and NIF Assurances Manager (Sandra Brereton) and found to be appropriately assigned. No Q-level 1 issues were identified. Two Q-level 2 issues were identified, specifically:

a) Structural failure due to pressure loading
b) Structural failure due to seismic loading.

No Q-level 3 issues were identified that have an impact on the vacuum testing of the spatial filter vessels

Lead engineer was questioned as to whether any changes to Q-levels should be made, based on knowledge of system details since the Q-levels were initially assigned. He had no new issues.

b) The NIF Quality Strategy form was generated and presented at the 100% design review as slide NIF97-0004114/JLM/lf-19. This document and personnel interviews determined that quality affecting activities for the purpose of this vacuum test MPR are:

2.1) Analysis/calculations: Engineering Safety Notes reviewed for this MPR under topic 4.1specifically address the two Q-level 2 issues(structural failures 1.1 and 1.2 above)

2.2) Procurement: Design and procurement review action item close out reviewed for the MPR under topic 5.0. Fabrication vendor inspection reports and NCRs reviewed for this MPR under topics 6.0 and 7.0

2.3) Cleaning: Cleaning vendor inspection reports and NCRs reviewed for this MPR under topic 6.0 and 7.0. Cleanliness control during the installation of the spatial filter components and during the vacuum test are covered under installation plan (topic11.0) and test plans)topic 12.0)

2.4) Erecting: Pedestal construction inspection reports and NCRs reviewed for this MPR under topic 6.0 and 7.0

2.5) Installing: Installation plans and procedures reviewed for this MPR under topic 11.0
2.6) Inspecting: Fabrication inspection reports and NCRs reviewed for this MPR under topics 6.0 and 7.0
2.7) Testing: Test plans and procedures reviewed for this MPR under topics 12.0 and 13.0

3) A quality strategy encompassing quality affecting activities 2.1 through 2.7 above was implemented, although only partly documented as a comprehensive "strategy" in the 100% design review. Review of the individual activities by the MPR committee is documented in the review forms corresponding to the topics listed under activities 2.1 through 2.7 above.

Are there any findings? If so, mark one:
Type A (pre-start): ☐
Type B (post-start): ☐

Description: Fully describe the finding.

No findings

Recommended Corrective Action:

None required

Review Item: **2.0 Critical Requirements for CSF/TSF Assembly and Test**	**Review Date: 27-Mar-01** **Reviewed by: Steve Bryan** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 3**

Criterion Met? Yes: X No:

Criterion:
Critical requirements for successful assembly and test of the CSF and TSF vacuum enclosures have been identified.

Approach:

1) Review the Design Basis Books, SDR002 and SSDR 1.4.1 and identify critical operating requirements of the CSF and TSF vacuum enclosures.
2) Review CSP-16 specifications and identify critical (performance) requirements of the installed, assembled CSF and TSF vacuum enclosures.
3) Interview Beamline Infrastructure personnel to identify critical requirements of components and sub-assemblies of the CSF and TSF vacuum enclosures.
4) Compile a list of critical requirements for assembly and test of the CSF and TSF vacuum enclosures.

Discussion of Results and Conclusion:
Critical requirements for assembly and testing of the CSF and TSF vacuum enclosures are a subset of requirements documented in the Design Basis Books, CSP-16 specifications, SDR002, and SSDR 1.4.1. Review and judgements of all specifications in these documents were made to identify specific requirements that pertain to the successful completion of CSF/TSF vacuum system assembly and testing activities. Requirements which, if not met or maintained, would place great demands on NIF's financial resources to rectify, or would introduce significant schedule delays or risk to personnel or equipment were deemed critical.

1)A review of CSP-16 specifications was conducted to identify acceptance requirements for cleanliness, vacuum level, vacuum rate of rise, vacuum leak rate, pressurization, pressure decay leak rate for fabricated vacuum system components: vacuum hardware, connecting tubes, beam tubes, valves and vessels. A list of specifications that were deemed to be critical to the successful assembly and testing of the CSF/TSF vacuum enclosures was compiled.

2)A review of the Design Basis Books, System Design Requirements for the laser system, and Sub-System Design Requirements for beam transport enclosures was made to identify critical requirements for vacuum level, cleanliness, and inert gas backfill pressure (under normal operating conditions of vacuum and pressurization) for the assembled system.

3) Interviews with CSF/TSF vacuum enclosures design team member(s) were conducted to identify requirements deemed "critical" to successful completion of assembly and testing activities. Input was solicited to ensure that all critical requirements were identified.

Following is list of requirements which have been deemed critical to the successful completion of activities related to CSF and TSF vacuum enclosure assembly and test. Critical requirements for CSF/TSF vacuum enclosure assembly and test have been arranged

NIF-0063546
UCRL-ID-143148

into three groups: critical requirements of components to be used in the CSF/TSF vacuum systems; critical requirements of assembly activities; and, critical requirements of the assembled vacuum system.

There are several requirements of the vacuum components (beam tubes, connector tubes, vessels, valves, etc.) which, if not met, could cause significant delays and costs to repair after assembly of a large part of the system:

1) Clean interior surfaces of components.
2) No significant leaks when pressurized with clean, dry air to 2.5kPa (10" H_2O).
3) No significant leaks present when evacuated to 0.001 Pa (1.0×10^{-5} torr).

Acceptance test data from test performed on CSF and TSF components indicate that these specifications have been met. Refer to MPR item #7.0 for details and findings.

Critical requirements for CSF and TSF vacuum enclosures assembly are as follows:

1) Maintenance of the cleanliness of the interior surfaces in accordance with NIF project standards, during assembly. Particular concern regarding procedures for preparation and installation of elastomer (o-ring) seals has been expressed. More specifically, all elastomer seals remaining in the system after testing has been completed must meet NVR specifications.
2) Performance of assembly work in a safe manner.

CSF and TSF vacuum enclosure installation plans and procedures have not been finalized, but provisions for maintaining cleanliness and addressing safety issues are being incorporated. Refer to MPR item #11.0 and 12.0 for details and findings.

The vacuum performance of the CSF and TSF components, sub-assemblies and complete enclosures are tested after assembly. This MPR will serve as the basis for the authorization of these tests. Critical performance requirements and requirements related to the testing of these assembled systems are as follows:

1) Assembled CSF/TSF vacuum enclosures must be capable of achieving a vacuum level of 0.001 Pa (1.0×10^{-5} torr) for vacuum leak testing using a Mass Spectrometer Leak Detector (MSLD) (ref: CSP-16).
2) Assembled CSF/TSF vacuum enclosures, when under vacuum at a level less than 0.001 Pa (1.0×10-5 torr), must have no single leak greater than 1.0×10^{-8} std ml/sec when measured with a MSLD according to accepted procedures (ref: CSP-16).
3) Rate of rise test results shall be recorded for each assembly of components when evacuated to a starting pressure of 0.001 Pa (1.0×10^{-5} torr) or less and isolated for a period of one hour (ref: CSP-16).
4) Assembled CSF/TSF vacuum enclosures, when pressurized to 2.5 kPa (11" H_2O) with argon, must have a total leak rate which is less than 0.63 std ml/sec when measured in accordance with accepted procedures (ref: CSP-16).
5) In order to prevent pressurization of vacuum enclosures beyond established maximum pressure specifications during pressure-decay testing, pressure limiting devices must be installed.
6) Measures must be taken to ensure that oil vapors from the pumping system used to evacuate

the CSF/TSF vacuum enclosure are prevented from back-streaming into the vessel under test.

7) Additional measures must be taken to ensure that vessels are back-filled with clean, dry air after tests are complete.

Are there any findings? If so, mark one
Type A (pre-start): ☐
Type B (post-start): ☐

Description:

No findings

Recommended Corrective Action:

None

Review Item: **3.0 Critical Requirements for CSF/TSF Assembly and Test Verified**	**Review Date: 27-Mar-01** **Reviewed by: Steve Bryan** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 2**

Criterion Met? Yes: [X] **No:** [ ]

Criterion:
Critical requirements for the successful completion of assembly and testing of CSF and TSF vacuum enclosures presented to Mark Jackson for review and approval.

Approach:
MPR topic 2.0 calls for generation of a list of requirements deemed critical to the successful assembly and test of CSF and TSF vacuum enclosures. A list of these requirements was compiled and reviewed by Systems Engineering (Mark Jackson).

Discussion of Results and Conclusion:

Critical requirements for assembly and testing CSF/TSF vacuum enclosure components have been reviewed and approved. Base pressure, maximum rate-of-rise, MSLD leak rate and pressure-decay leak rate, cleanliness and precision cleaning specifications cited in CSP-16 are consistent with design and conservative when compared to operation requirements.

Concerns/observations expressed by Mark Jackson include:

1) Variability of vacuum requirements of CSF/TSF enclosures. For the purposes of this review, the most conservative specifications encountered were adopted as critical requirements.
2) Elastomer seal preparation and proper installation were viewed by Mark Jackson to be critical. Special concern was expressed about conformance with NVR specifications. O-ring seals that will remain installed on the systems after testing operations are completed must meet the specifications for NVR's. This subject area was added to the list of critical requirements for CSF/TSF installation (refer to MPR item #11.0).
3) A desire was expressed to incorporate multiple, redundant systems for protecting the CSF/TSF vacuum enclosures from pressurization beyond acceptable levels during testing operations. This suggestion was added to the list of critical requirements for CSF/TSF leak testing (refer to MPR item #12.0 for details and findings).
4) A specification for maximum acceptable rate-of-rise for assembled vacuum enclosures should not be included in the installation acceptance tests. A requirement exists; however, for the measurement of (vacuum) rate-of-rise prior to MSLD leak testing. Completion of this measurement is a critical requirement (refer to MPR item #12.0 for details and findings).
5) The introduction of contaminants into the assembled CSF/TSF vacuum enclosures during performance testing is also a concern. The primary concern is backstreaming oil vapors from the system of pumps used to evacuate the enclosure for tests. Some trapping mechanism must be employed if non-oil-free pumps are used to evacuate the enclosure under test. Of equal importance, is the concern that adequate procedures for vessel

evacuation and backfill (either for repair or after testing is complete) are defined and implemented. A check should be made to verify that these concerns are addressed in the final draft of the acceptance/performance testing procedure. This subject area was added to the list of critical requirements for CSF/TSF installation (refer to MPR item #12.0).

A complete list of specific critical requirements for CSF/TSF vacuum enclosure assembly and testing is included in MPR topic 2.0 documentation.

Are there any findings? If so, mark one:
Type A (pre-start): ☐
Type B (post-start): ☐

Description:

No findings

Recommended Corrective Action:

None

Review Item:	**Review Date: 3/27/01**
4.0 Safety Documents	**Reviewed by: Terry Bevers**
4.1 Engineering Safety Notes	**FSD: N.L.1.2.2, N.L.1.2.4**
	Page: 1 of 2

Criterion Met? Yes: ☐ **No: X**

Criterion: The System Design Requirements for the Spatial Filter System were identified and all Engineering Safety Notes were found to be complete.

Approach:

1. Review 100% Title II Design Review, December 18, 1997, 2 Volumes, specifically the SDRs & SSDRs.
2. Interview responsible engineer to verify understanding of total requirements.
3. Review major component and installation drawings of the CSF & TSF Systems.
4. Verify that all DRs and ECRs were reflected in the final calculations.
5. Review all Engineering Safety Notes applicable to the Spatial Filter System design and installation and verify compliance to established LLNL Mechanical Engineering Policies and Procedures & Design Safety Standards.
6. ESNs included in this review are MESN-98-010-0A , ("Spatial Filter Beam Tubes"), MESN-98-011-0A ("Spatial Filter Center Vessels"), MESN-98-012-OA ("Spatial Filter End Vessels"), & MESN-01-034 ("Alignment and Diagnostic Vacuum Windows for CSF and TSF") plus items identified by Lead Engineer that will be included in addenda to the original safety notes.
7. Note any deficiencies and recommend any corrective action.

Discussion of Results and Conclusion:

ESNs MESN98-010-0A, -011-0A, & -012-0A and Addenda to each ESN were reviewed and all comments were considered and corrections were made by March 30, 2001. The existing ESNs were only reviewed for general content since they had been previously released. The bulk of the review concentrated on the technical review of the Addenda associated with each ESN, and whether it fully addressed the deficiencies identified by the CSF/TSF lead engineer. Each Addendum addressed all the deficiencies from the original ESN and met LLNL ME design safety standards. The Addenda were authored by senior mechanical engineers and reviewed by senior Mechanical Engineering staff. There were no action items identified other than small corrections and typographical errors that will be corrected prior to approval and release. Applicable DRs and ECRs were checked during the investigation of all NCRs in the 4.1 Review Report, and were found to be appropriately reflected in the Safety Notes.

The ESNs met the requirements of LLNL Mechanical Engineering Policies and Procedures & Design Safety Standards. MESN-01-034 on window assemblies is incomplete.

Are there any findings? If so, mark one: **Type A (pre-start): X** **Type B (post-start): X**
Description: **Type A finding:** Problem Record 2000-0042 identified window breakage due to a design flaw. The window support system was redesigned to assure stresses in the window would not exceed 500 psi. MESN-01-034 is in progress to validate the window design. The redesigned Window Assemblies will be installed by JFI at Installation, CSP-16. **Type B finding:** The assumptions of loadings and use and analysis methods used in the ESN calculations should be consistent with the plans and procedures for commissioning and operations.
Recommended Corrective Action: **Type A finding:** MESN-01-034 must be completed prior to installation and leak checks of the windows. **Type B finding:** Commissioning MPRs and Operation MPRs should include a verification that commissioning plans and procedures and operations plans and procedures are consistent with the assumptions of loadings and use and analysis methods used in the ESN calculations.

Review Item:	**Review Date: 3/25/01**
4.0 Safety Documents	**Reviewed by: Glenn Hermes**
4.2 Safety Procedures	**FSD: N.L.1.2.2, N.L.1.2.4**
4.2.1 JHA's & SPA's	**Page: 1 of 2**
4.2.2 Special clothing, safety equipment, etc.	

Criterion Met? Yes: No :X

Criterion: Hazards have been reviewed and adequate safety procedures and controls have been developed and put into place for this activity. Specific controls for venting vacuum vessels, pressure controls, handling gas bottles, entering confined space, etc. have been addressed. The required JHA's and SPA's have been completed. All safety equipment, special clothing, and warning signs have been identified and put into place or made available.

Approach:

1)Documents and records review. Reviewed the available installation procedures (LB 16-19) and test procedures LT-002, LT-101 and JHA for Vacuum Leak Testing of Cavity Spatial Filter and Transport Spatial Filter.
2)Personnel interviews. BIS Operations and Commissioning Manager, NIF Project ES&H Assurances Manager, Lead LLNL Mechanical Engineer for the CSF & TSF.
3)Walk-downs, inspections, observations of activities. N/A Test area and equipment were not set up at the time of this review.

Discussion of Results and Conclusion:

Specific safety items such as fall protection and permit required confined space were noted within the Jacobs procedures reviewed. The requirement for a Hoisting And Rigging Safety Review was also noted. A preliminary JHA for this work listed the specific hazards and controls associated with fall protection, oxygen deficiency, potential catastrophic failure of overhead tubes, and hoisting and rigging of heavy loads.

Procedure LT-101, General Procedure for HMS-Leak Testing of Precision Cleaned NIF Equipment by the Hood Method specifically references the safety notes, JHA, SPA, and NIF Construction Safety Program. As prerequisites, it also requires reference to the IMI -1.1, Safety Plan , and IMI-1.2, NIF Construction Safety Program (CSP) . Specific work procedures and checklists, when developed, should expand upon the detail and requirements of these references and prerequisites.

The Installation Verification Checklist for TSF Beam Tube Installation specifically calls for sign off by specific Jacobs personnel (supervisors, safety, inspectors, etc.) of the JHA, SPA, and Hoisting And Rigging Safety Review for the work about to be performed.

Safe Plans of Action (SPAs) were not available for review during the MPR. SPAs are to be prepared by the work crew, on the day they are actually going to conduct the work (ref, Project Procedure 5.10, Safe Plan of Action (SPA) Process, Rev. 1, NIF-0050987, 3/9/01). On a day when

a new task is to be conducted, a SPA will be developed for that task during the SPA meeting at the beginning of the shift The procedures covering the beamline testing require that a SPA be prepared.

Many of the procedures and job specific safety documentation for this work are in draft form and still under development. A review of the available material indicates that NIF management and Jacobs have good policies and procedures in place, a strong commitment to safety and appropriate resources available to complete the required procedures for this work.

Are there any findings? If so, mark one:
Type A (pre-start): X
Type B (post-start):

Description:.

All procedures for this work have not been completed. The JHA has not been reviewed and approved.

Recommended Corrective Action.
Complete all the procedures and safety documents such as: JHA's, job specific lifting plan, LT-102 General Procedure for HMS-Leak Testing by the Tracer Probe Method, LT 202 HMS Leak Testing Procedure for Spatial Filter Bundles, and a procedure for Pressure Decay Testing. This should include the review, approval and release of these documents before beginning any of the work. All procedures must meet the requirements specified within CSP-16 and associated engineering drawings. LLNL must review the procedures for reference to LLNL Engineering Safety Notes (ESN's) where applicable. ESN's often include specific methods and assumptions for assembly, installation, and operations. These items must be specifically included in these procedures. LLNL must also include a review of the Jacobs Verification Checklists for any NCR and ESN related issues..

Review Item: **4.0 Safety Documents** **4.3 Safety Basis Documentation**	**Review Date: 3/13/01** **Reviewed by: S. Brereton** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 1**

Criterion Met? Yes: No:

N/A

Criterion: The requirement to have a current, approved safety basis is not applicable for the beamline vacuum tests. Operating facilities require documentation (e.g., Preliminary Hazards Analysis, Hazards Analysis Report, Safety Analysis Report) defining the hazards, controls, and the safe operating envelope for the expected set of activities to be conducted at the facility. At the time the beamline vacuum tests will be conducted, the LTAB will be a construction site and the tests will be part of a construction activity. Consequently, a safety basis is not required. The safety of activities conducted at the construction site is governed by the NIF Construction Safety Program (CSP) and the NIF Infrastructure Health and Safety Plan (Jacob's Safety Plan). Additional documentation, such as a Job Hazards Analysis and Safe Plan of Action, is required before the tests can be conducted, in accordance with the NIF CSP, the Safety Plan, and implementing safety procedures.

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A
Type A (pre-start): ☐
Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item:	**Review Date: 3/19/01**
5.0 Critical design review action items	**Reviewed by: Jeff Williams**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 1

Criterion Met? Yes: X No: ☐

Criterion:
All action items from final design and procurement reviews will have been resolved or else determined to have no impact on the vacuum test if not resolved.

Approach:
1)Documents and records review. (Design Review action items list, Procurement Review action items list.)
2)Personnel interviews. (Bill Collins, Lead Engineer, Dennly Becker, formerly manager of Design Review documents, Dwight Lang, BIS Production Manager.)
3)Walk-downs, inspections, observations of activities. (N/A.)

Discussion of Results and Conclusion:
Review of all comments and action item notes from the 65%, 100% design reviews for the spatial filters show that there are no impact 1 or 2 comments that affect the vacuum test which have not been resolved (Design review comments must be assigned an impact level: Type 1, if left unresolved could result in a recommendation of rejection of a specific aspect of the design; Type 2, if left unresolved could result in a recommendation of acceptance of the design, with comment; Type 3 comments provide information and suggestions to the design team).

Review of all comments and action items from the spatial filter procurement review show that there are no comments that affect the vacuum test which have not been resolved.

Are there any findings? If so, mark one:
Type A (pre-start): ☐
Type B (post-start): ☐

Description:

No findings.

Recommended Corrective Action:

No action required.

Review Item:	**Review Date: 3/26/01**
6.0 Critical NCR Closeout	**Reviewed by: Terry Bevers**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 2

Criterion Met? Yes: X No:

Criterion:
The Inspection Reports for all the components of the NIF Spatial Filter System were reviewed and all Non-Conformance Reports for critical components are complete.

Approach:
1) Since there are thousands of components comprising the Spatial Filter System, a graded approach was used to establish completeness of critical NCRs.
2) Reviewed the ESNs to establish primary components with Safety Factors less than 4.0. This was done to identify components where dimensional non-conformance could reduce design margins below safe levels (SF<3).
3) An interview with the responsible contract administrator, coordinator, & engineer was conducted to identify any outstanding non-conformance issues of the components with the lesser margins of safety.
4) PICS system was searched for relevant NCRs.
5) Logs for Non-Conformance/Engineering Change Request/Deviation Request were reviewed to ascertain scope of work to review applicable NCRs. As large numbers of NCRs were noted, a graded approach was used to effectively utilize the MPR committee's effort.
6) Completeness of the Procurement Record was reviewed with a cursory check of NCRs and up to 10 units maximum for each order were randomly chosen to verify compliance to reporting requirements.
7) Verify that no outstanding NCRs exist.
8) If any NCR is incomplete, establish action to close prior to the end of March 2001.
9) A walk-down of some randomly chosen items was done to verify their readiness for test.

Discussion of Results and Conclusion:
The procurement records of the following components were reviewed: 16 each End Vessels, 4 each TSF Center Vessels, 4 each CSF Center Vessels, 192 each Rectangular Beam Tubes, 240 each Circular Beam Tubes, 192 each End Vessel Rectangular Blank-Off Covers, 96 each Extension Tube Assys, 96 each Round End Vessel Port Covers, 768 each Connector Tubes, 216 each Kinematic Bellows, 72 each TSF/CSF Vacuum Vessel Top Rectangular Covers, Pre-bought SST from Lukens, and Precision Cleaning Records for all CSF/TSF Assy components.

Nonconformance and Deviation Request records were well organized for each Purchase Order and review of the entire purchased lot was easy, even though 100's of documents were involved for all of the purchased items.

After review of Engineering Notes, MESN98-010, -011, -012 and Addendum to each, a list of components with safety factors less than 4.0 was generated and used as a guide concentrating only on the components with low safety factors when reviewing the NCRs and DRs.

Only two NCRs were of concern to the responsible engineer, so the dispositions were followed up

and verified that neither one affected the safety margins listed in the existing ESNs of record. Matt Fischer said there were several parts that had cleaning problems still unresolved and PICS items have been generated to identify eventual resolution at assembly.
The BIS QA manager identified several cases of incomplete NCRs with dimensional deviations without resolution, but further review of these by Dennis Rankin indicated that these discrepancies did not affect fit or function. The BIS QA manager assured that all files were reviewed and were found to meet all QA requirements.

90 NCRs and 99 DRs were reviewed in 11 Procurement Reports and none were found that would affect the fit, form, or function of any major component comprising the CSF and TSF Spatial Filter Assembly. All documents reviewed had approvals by the responsible parties and were complete.

The Procurement Records including all Critical NCRs meet the requirements of the LLNL Mechanical Design Safety Standards and PCM Procedures 3.2, 7.4, & 7.5 Nonconformance Reporting, Procurement Planning, Scheduling, Review, and Approval, & Subcontract Administration respectively.

Are there any findings? If so, mark one:
Type A (pre-start): ☐
Type B (post-start): ☐

Description:
None

Recommended Corrective Action:

None

Review Item:	**Review Date: 3/27/01**
7.0 Critical Test Data and Inspection Results	**Reviewed by: Steve Bryan**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 2

Criterion Met? Yes: X **No:** ☐

Criterion:
1) Test and inspection data from CSF and TSF components and sub-assemblies that is necessary to safely conduct the vacuum test is complete and reviewed for compliance with requirements and specifications.

Approach:
1) Documents and records review. (Test and inspection records)
2) Personnel interviews. (Bill Collins, lead engineer, Mike Benapfl, vendor vacuum test inspection witness.)
3) Walk-downs, inspections, observations of activities. (N/A)

Discussion of Results and Conclusion:
Acceptance tests were performed on all vacuum components destined for use on NIF CSF and TSF vacuum enclosures. Conformance of CSF/TSF components with critical requirements was verified during implementation of the following acceptance tests:

1) Pressure leakdown test: Leak rate must be less than 0.63 std ml/sec at 2.5kPa air pressure.
2) Vacuum leak test: No single leak shall be greater than 1.0×10^{-8} std ml/sec measured with MSLD while vacuum level is less than 0.001Pa (1.0×10^{-5} torr).
3) An additional requirement, imposed during implementation of acceptance testing, was that the cumulative leak rate for any single component (beam tube, connector tube, vessel, etc.) shall not exceed 1.0×10^{-8} std ml/sec.
4) Precision Cleaning to level 83-A/10 per MIL-STD-1246C was performed on all vacuum components of the CSF/TSF vacuum enclosure.
5) Any component failing to meet these specifications was returned to the vendor for repair and re-test.

An interview was conducted with Mike Benapfl to ascertain his level of involvement in acceptance/performance tests performed on vacuum components of the TSF and CSF vacuum enclosures. Mike was directly or indirectly involved in acceptance tests performed on the following components over the entire duration of production:

1) CSF/TSF End Vessels (16)
2) TSF Center Vessels (4)
3) 529 thru 536 Beam Tube Assemblies (384)
4) TSF Vacuum Connector Tube (24)
5) SF1, SF2 Beam Tube Assemblies (48)
6) CSF1 Straight Tube Assemblies (336)

This list constitutes a large proportion of the major vacuum components of the CSF and TSF vacuum enclosures. To his knowledge, only three vacuum components failed to meet vacuum leak rate specifications; all were returned to the vendor for repairs and later passed the acceptance tests.

Mike also conducted on-site inspections of the following vendors' facilities and found their manufacturing practices to be fundamentally sound: Ranor, Stadco, Meyer Tool, Lukas Machine, Inc. and March Metal Fabricators. In addition, an on-site QA inspector was contracted to monitor fabrication and acceptance test activities at Meyer Tool, Ranor and Stadco.

A review of approximately 200 Non-Conformance Reports (for CSF/TSF vacuum components) was conducted by MPR committee member T. Bevers. The results of this review confirm that problems associated with performance of vacuum components are likely to be very rare as no NCR was found containing issues related to vacuum or pressure leak test deficiencies.

Are there any findings? If so, mark one:	
Type A (pre-start):	☐
Type B (post-start):	☐
Description: No findings.	
Recommended Corrective Action: None.	

Review Item: **8.0 Critical Calibration Data or Calibration Plans**	**Review Date: 3/27/01** **Reviewed by: Steve Bryan** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 3**
Criterion Met? Yes: ☐ **No:** ☒	
Criterion: Critical calibration data that is necessary for safe assembly and test of the CSF and TSF vacuum enclosures have been identified and procedures for performing periodic tool calibration are in place.	

Approach:

1)Documents and records review. (Construction Subcontract Package – CSP-16; JFI CSF and TSF vacuum enclosure test plan LT-02; JFI CSF Installation Procedure LB-17; JFI TSF Installation Procedure LB-19)

2)Personnel interviews. (Mike Benapfl – BIS Acceptance Test Witness; Bill Collins – BIS Lead Engineer)

3)Walk-downs, inspections, observations of activities. (N/A)

Discussion of Results and Conclusion:

A review of documents and records resulted in the following potential areas for critical calibration data:

1) Assembly – torque specifications (torque wrench calibration).
2) Cleanliness – SP-02 Special Procedure (measurement instruments)
3) Leak Test – Leak Rate Measurement (helium mass spectrometer leak detector)
4) Pressure-Decay Test – Pressure Gauge (Bourdon Tube or other)
5) Pressure-Decay Test – Pressure Relief Device (to protect components from overpressure)
6) Vacuum Rate-of-Rise Test – Ionization Gauge (cold cathode or BA).

Torque wrench calibration data was reviewed for one electronic data logging torque wrench made by Ingersoll Rand. Calibration was performed at the factory and sufficient data was present to confirm operation within designed tolerances. It is not known at this time whether other torque wrenches are to be used in CSF/TSF assembly work; however, calibration data for every torque wrench used in CSF/TSF assembly should be recorded in JFI's installation report. Additional verification should be performed on a daily basis (when the wrench is used) using a torque standard to confirm normal operation. The collection of calibration data including torque wrench serial number, calibration date and daily verification should be implemented in JFI's CSF/TSF installation procedures and reports prior to starting assembly activities. This is a type "A" finding as quality and safety may be compromised.

Measurements of internal cleanliness of beam tubes, etc. are obtained using swipes called for in special procedure SP-02. While particle counters, used as a component of SP-02, document cleanliness for the purpose of maintaining acceptance specifications, commencement of assembly or testing activities are not contingent upon cleanliness measurement results. Consequently, calibration of instruments for performing this measurement is not pertinent at this time.

During MSLD leak measurements, the helium mass spectrometer leak detector is calibrated using two certified helium leak standards per CSP-16. JFI's Leak test report form for procedure LT-101 included provisions for recording the serial number and leak rate of these certified leaks. Leak test procedure LT-101 also includes steps for calibrating the leak detector before performing each leak measurement operation. A check of MSLD calibration is also made after each measurement. While JFI's test procedure addresses the issue of MSLD calibration, it doesn't yet include a check to verify that certified leaks have been calibrated within the past year. This step should be included in JFI's leak test procedure. This is a type "A" finding that must be corrected before testing begins.

During Pressurization of components with air, a pressure-measuring device will be used to confirm

pressurization to 2.5kPa. This gauge must be calibrated annually per CSP-16. Procedures for pressurization of components have not yet been reviewed to confirm collection of calibration data. A separate Pressure Relief Device must also be installed per LLNL ES&H Manual and must be calibrated at least every three years. This data should be a checkpoint on JFI's pre-start checklist, when complete. This is a type "A" finding and must be addressed before testing activities begin.

A vacuum rate-of-rise test to be performed on CSF and TSF components is mandated by CSP-16. JFI test procedures do not yet implement this test, therefore it cannot be confirmed that data is collected or calibration performed. During acceptance testing performed by component vendors, calibration of ionization gauges (hot filament or cold cathode) was not considered critical by LLNL witnesses because very large calibration errors in this pressure measurement are tolerable while still meeting beamline operational vacuum requirements. Pressure measurements (by capacitance manometer) for rate-of-rise test were considered critical. Calibration of this pressure measuring device must therefore be performed annually, a check inserted in the procedure to verify current calibration and calibration data should be recorded on the test report form. This is a type "A" finding as it impacts installation quality, and must be corrected before testing activities begin.

Are there any findings? If so, mark one:
Type A (pre-start): [X]
Type B (post-start): [ ]

Description:

1) Provisions are not currently in place to verify that torque wrenches used in CSF/TSF installation are calibrated.
2) Provision are not currently in place to verify that certification of calibrated leaks to be used to calibrate a MSLD are valid.
3) Provisions are not currently in place to verify that the pressure gauge used to perform pressure-decay test measurements is calibrated.
4) As the design is not complete, it has not been determined if the pressurization system will require a pressure relief device. If one is required, then provisions are not currently in place to verify that Pressure Relief Devices used to protect components from overpressurization during pressure-decay testing have been calibrated.
5) Provisions are not currently in place to verify that the Capacitance Manometer used to make pressure measurements for the Rate-of-Rise test is calibrated.

Recommended Corrective Action:

Deficiencies must be addressed by inserting appropriate steps into the JFI leak test procedure or pre-start checklist prior to start of testing activities. Reporting records should also provide for recording serial numbers of equipment and calibration dates.

Review Item:	**Review Date: 3/25/01**
9.0 Up to date red-line drawings	**Reviewed by: Jeff Williams**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 2

Criterion Met? Yes: X No: ☐

Criterion:

1) Either formal as-built or red-line drawings exist for all fabricated components that are part of the vacuum enclosure in the CSF and TSF by the time that such components are ready for vacuum test
2) The changes (either in redline or formal) are consistent with the model on which the engineering analysis was performed, that is, the component configuration that was analyzed is sufficiently similar to the components that were actually fabricated that the analysis remains valid.

Approach:

1) Documents and records review. (Search SHERPA database for all outstanding ECRs for all fabricated components that are part of the vacuum enclosure in the CSF and TSF Verify that any outstanding ECRs do not impact the safety of the CSF or TSF during the vacuum test.)
2) Personnel interviews. (Bill Collins, lead engineer, Bernie Merritt, Engineering Services Manager.)
3) Walk-downs, inspections, observations of activities. (N.A.)

Discussion of Results and Conclusion:

1) The Lead engineer states that there are no redlined drawings for any component in the CSF or TSF. He said that any changes to the drawing were processed as ECRs and if not already incorporated in the drawing version under configuration management, can be found as outstanding ECRs in SHERPA.

2) Search of the SHERPA database resulted in the generation of a list of drawings, which had outstanding (not incorporated) ECRs. Item-by-item review of these ECRs by the Lead Engineer showed that none of the outstanding ECRs affect the vacuum test. The outstanding ECRs are generally for format changes to the drawings and for design feature changes, such as the scattered beam blockers, which do not affect the vacuum test.

3) Verification that the engineering analysis represented the as-built components and system was verified under Review Item 4.1.

Are there any findings? If so, mark one:
Type A (pre-start): ☐
Type B (post-start): X

Description: Outstanding ECRs exist for changes to drawings, which do not affect the vacuum test.
Recommended Corrective Action: Track outstanding ECRs until complete.

Review Item:	**Review Date: 3/25/01**
10.0 Expected failure modes **10.1 Repair shutdown requirements** **10.2 Repair plans for high-impact failures**	**Reviewed by: Glenn Hermes / Steve Bryan** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 2**

Criterion Met? Yes: No: X

Criterion: Expected failure modes and controls with respect to vacuum testing have been identified and documented. Response to significant leaks to control vessel cleanliness, system response and recovery in case of power failure, and response to potential operator error and how it might affect test equipment and vessel cleanliness have been developed and documented.

Approach:

1)Documents and records review. Reviewed the available installation procedures (LB 16-19) and test procedures LT-002, LT-101 and the preliminary JHA.
2)Personnel interviews. BIS Operations and Commissioning Manager
3)Walk-downs, inspections, observations of activities. N/A

Discussion of Results and Conclusion:

Only a few expected failure modes have been identified and discussed.

Specific safety related issues such as oxygen deficiency, elevated work and catastrophic failure of a beam tube during evacuation have been considered and identified in the JHA.

The only process related issue that has been identified at this point, is an unacceptable leak rate. In this event, per procedure LT-101, "the operator must make the best judgement related to the circumstances." More detailed options should be discussed. Considerations to cleanliness and impact on further leak tests should be identified and discussed.

Additional process issues such as potential operator error or power failure and their impact on safety and cleanliness should be reviewed.

Are there any findings? If so, mark one:
Type A (pre-start): X
Type B (post-start):

Description:

Additional expected failure modes such as a power failure or operator error should be identified and reviewed.

Recommended Corrective Action:

A more thorough review of expected failure modes and their impact should be conducted. Items and their controls should be identified and included in the appropriate test procedures.

Review Item: **11.0 Installation plan and procedures**	**Review Date: 3/25/01** **Reviewed by: Glenn Hermes / Howard Patton** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 2**

Criterion Met? Yes: No: X

Criterion: A detailed installation plan and procedure, covering specific technical and safety issues, has been developed and documented for this activity. Procedures for the assembly of the vacuum connections and specific installation processes that might impact vessel structure or vacuum testing have been developed and documented. A specific lifting plan for beam tube subassemblies that need to be lifted and held in place during connection to the end and center vessels has been developed and documented.

Approach:

1) Documents and records review. Reviewed the available installation procedures (LB 16-19)
2) Personnel interviews. BIS Operations and Commissioning Manager, Lead LLNL Mechanical Engineer for the CSF & TSF
3) Walk-downs, inspections, observations of activities. N/A

Discussion of Results and Conclusion:

Detailed installation procedures for both the CSF and TSF have been developed. A specific Installation Verification Checklist (IVC) has been developed for the TSF.

These procedures and checklists are very detailed and identify specific safety, and cleanliness items. Several “hold points “ are included to coordinate and validate with LLNL interfaces.

The IVC available for the TSF installation is a very detailed and specific, item by item, verification checklist. Requirements to review the JHA, SPA, and Hoisting and Rigging Safety Review are included. Specific personnel (safety, supervisor, inspector, etc.) are identified that are required to sign off on each item.

The installation plans require the submittal of a generic rigging and handling plan for GFE. A specific lifting plan, specifying requirements and lifting fixtures for the CSF and TSF equipment should be developed. This is a requirement of the CSP-16 specification 15896. The plan and lifting fixtures need to be submitted to LLNL for review and approval.

Are there any findings? If so, mark one: **Type A (pre-start): X** **Type B (post-start):**
Description: The current versions of the installation procedures for this work are still in draft form.
Recommended Corrective Action: Complete the installation procedures and a job specific lifting plan including review, approval and release of these documents before any of this work is started. All procedures must meet the requirements specified within CSP-16 and associated engineering drawings. LLNL must review the procedures for reference to LLNL Engineering Safety Notes (ESN s) where applicable. ESN s often include specific methods and assumptions for assembly, installation, and operations. These items must be specifically included in these procedures. LLNL must also include a review of the Installation Verification Checklists for any NCR and ESN related issues.

Review Item: **12.0 Test plan and procedures**	**Review Date: 3/25/01** **Reviewed by: Glenn Hermes** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 2**

Criterion Met? Yes: No: X

Criterion: A detailed test plan and procedure, specifying required tests and data, has been developed for this activity. Procedures for maintaining cleanliness of vessels during vacuum testing and venting, specific processes for testing and documenting vacuum pressures and leak rates, and a specific test plan for leak checking have developed and documented.

Approach:

1) Documents and records review. Reviewed the available installation procedures (LB 16-19) and test procedures LT-002 and LT-101.
2) Personnel interviews. BIS Operations and Commissioning Manager, Lead LLNL Mechanical Engineer for the CSF & TSF, , Sr. LLNL Mechanical Engineer (familiar with SF vacuum testing and requirements) interview with Jacobs Field Test Engineer.
3) Walk-downs, inspections, observations of activities. N/A

Discussion of Results and Conclusion:

Several draft test procedures were available for review.

LT-002 Leak Testing Plan for Spatial Filters (laser bay beam path zones 2 and 4) provides a good general plan describing the scope and approach to the spatial filter leak testing.

LT-101 General procedure for HMS-Leak Testing of Precision Cleaned NIF Equipment by the Hood Method provides a good overview of the hood type leak testing for this equipment. Specific safety references are noted, including, safety notes on vessels and beam tubes, JHA, SPA, and the NIF Construction Safety Program. Included as prerequisites, are references to precautions and safety controls such as the INI-1.1 "Safety Plan," and IMI-1.2 "NIF Construction Safety Program." Other prerequisites identified include, a pretest briefing for all personnel involved, a specification for pretest conditions, and approvals required for test start authorization.

The current procedures are a good start, but more specific procedures, verification checklists, and supporting documentation need to be developed. Such as, but not limited to:

LT 102 General procedure for HMS-Leak testing by the tracer probe method.
LT 202 HMS leak testing procedure for spatial filter bundles
A procedure for Pressure Decay Testing

Other specific issues that should to be addressed as part of the test procedures or supporting documents are noted in sections 4.2, 10.0, 15.0, 17.0, and 19.0 of this MPR.

Are there any findings? If so, mark one:
Type A (pre-start): X
Type B (post-start):

Description:

The entire set of test procedures and checklists for this work has not been completed.

Recommended Corrective Action:

Complete the required procedures and checklists including review, approval, and release of these documents before the specific work begins. All procedures must meet the requirements specified within CSP-16 and associated engineering drawings. LLNL must review the procedures for reference to LLNL Engineering Safety Notes (ESN s) where applicable. ESN s often include specific methods and assumptions for assembly, installation, and operations. These items must be specifically included in these procedures. LLNL must also include a review of the Jacobs Verification Checklists for any NCR and ESN related issues.

Review Item: **13. Software Test Plan and Procedures**	**Review Date: 3/13/01** **Reviewed by: S. Brereton** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 1**
Criterion Met? Yes: ☐ **No:** ☐ N/A	
Criterion: The requirement to have a software test plan and procedures is not applicable for the beamline vacuum tests. No specific software has been developed for use in the beamline vacuum tests. There are no critical equipment data acquisition or control systems that affect safety.	
Approach: N/A	
Discussion of Results and Conclusion: N/A	
Are there any findings? If so, mark one: N/A **Type A (pre-start):** ☐ **Type B (post-start):** ☐	
Description: N/A	
Recommended Corrective Action: N/A	

Review Item:	**Review Date: 3/13/01**
14.0 Commissioning Plan and Procedures	**Reviewed by: S. Brereton**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 1

Criterion Met? Yes: ☐ **No:** ☐

N/A

Criterion: The requirement to have a commissioning plan and procedures is not applicable for the beamline vacuum tests. The beamline vacuum tests are a construction activity rather than a commissioning activity. A test plan/procedure (including cleanliness control issues) adresses the specifics of the beamline vacuum tests (see items 12 and 15).

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A

Type A (pre-start): ☐

Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item:	**Review Date: 3/25/01**
15.0 Cleanliness control plan	**Reviewed by: Glenn Hermes**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 2

Criterion Met? Yes: No: X

Criterion: A detailed plan has been developed that specifies the cleanliness control processes to be used during the vessel vacuum testing. The plan includes details on establishing and maintaining cleanliness prior to, during and after the vacuum tests. The required level of cleanliness has been specified. The plan covers cleanliness issues for vacuum testing, leak testing, and vessel entry.

Approach:

1) Documents and records review. Reviewed the available installation procedures (LB 16-19) and test procedures LT-002 and LT-101.
2) Personnel interviews. BIS Operations and Commissioning Manager, Lead LLNL Mechanical Engineer for the CSF & TSF
3) Walk-downs, inspections, observations of activities. N/A

Discussion of Results and Conclusion:

The detailed assembly procedures for the CSF and TSF include detailed and specific instructions required to maintain and test cleanliness during component assembly. Specific cleanliness procedures are referenced, including:
SP-01 Level 2 Cleanliness
SP-02 Level 4 Cleanliness
SP-03 Tool Cleaning Procedure.

Specific leak testing procedures are still under development. The draft procedures reviewed for general leak testing mention cleanliness as an issue, but do not provide any specific details or controls.

Are there any findings? If so, mark one: **Type A (pre-start): X** **Type B (post-start):**
Description: The drafts of the general vacuum test procedures note the requirement to maintain cleanliness, but do not provide details or controls. Specific vacuum test procedures are still under development. Specific cleanliness requirements and controls should be included in these specific test procedures.
Recommended Corrective Action Complete the specific vacuum test procedures, including requirements and controls for cleanliness. Review, approve and release these documents before beginning specific work.

Review Item:	**Review Date: 3/13/01**
16.0 Operations Plan and Procedures	**Reviewed by: S. Brereton**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 1

Criterion Met? Yes: ☐ **No:** ☐

N/A

Criterion: The requirement to have an operations plan and procedures is not applicable for the beamline vacuum tests. The beamline vacuum tests are a construction activity and are not part of sustained operations. Therefore, they do not require an operations plan or procedures. A test plan/procedure (including cleanliness control issues) addresses the specifics of the beamline vacuum tests (see items 12 and 15).

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A

Type A (pre-start): ☐

Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item:	**Review Date: 3/25/01**
17.0 Training requirements and verification	**Reviewed by: Glenn Hermes**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 2

Criterion Met? Yes: No: X

Criterion:
A detailed plan that specifies the training requirements for this activity has been developed and documented. Requirements for training are specified throughout CSP-16 and NIF Construction Safety Plan. The training plan includes specific training requirements for the personnel identified in the staffing plan detailed in section 19.0 of this MPR. Training has been documented and training of personnel has been verified prior to beginning this work.

Approach:
1) Documents and records review. Reviewed Jacobs Training, Qualification, and Certification of Commissioning Test Personnel (IMI-9.3) and a draft of LT Personnel Qualification, Certification for JFI at NIF and CSP-16.
2) Personnel interviews. BIS Operations and Commissioning Manager
3) Walk-downs, inspections, observations of activities. N/A

Discussion of Results and Conclusion:
Training, Qualification, and Certification of Commissioning Test Personnel (IMI-9.3) is a general project procedure for Jacobs. The document specifies educational requirements and general responsibilities for Level 1 through Level 3 commissioning test personnel. This document is appropriate and adequate as a general project level procedure. It does not contain the specific training and qualification requirements for this work. The document, LT Personnel Qualification and Certification for JFI at NIF, further defines the general education and experience requirements, and the training and certification process for the 3 levels of test personnel

The general procedures and processes developed by Jacobs for training are very good. Implementation of their process to this specific work will provide highly trained and qualified personnel.

NIF-0063546
UCRL-ID-143148

Are there any findings? If so, mark one: **Type A (pre-start): X** **Type B (post-start):**
Description: The Jacobs process for training and qualification is in place. Implementation of this process needs to be completed for this work. All those workers who will participate in the testing have not yet been identified and so we can not confirm that they have been trained in the SPA process.
Recommended Corrective Action: Personnel required to perform the vacuum tests need to be identified. Specific training and qualification for this work, using the established Jacobs processes, needs to be completed and verified before specific work begins. This should include appropriate safety training for performing work at the NIF site.

Review Item:	**Review Date: 3/25/01**
18.0 Critical Maintenance plan and procedures	**Reviewed by: Glenn Hermes**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 1

Criterion Met? Yes: No:

N/A

Criterion: This element of the MPR is with respect to the long-term operation of facilities or equipment. These vacuum tests will be performed using a temporary installation of auxiliary equipment. The contractor will maintain this equipment per manufacture recommendations during the test period. A detailed maintenance plan for this equipment is not required.

Approach:
1) Documents and records review. N/A.
2) Personnel interviews. BIS Operations and Commissioning Manager
3) Walk-downs, inspections, observations of activities. N/A

Discussion of Results and Conclusion:
N/A

Are there any findings? If so, mark one:
Type A (pre-start): ☐
Type B (post-start): ☐

Description:
N/A

Recommended Corrective Action
N/A

Review Item:	**Review Date: 3/25/01**
19.0 Staffing plan and associated schedule	**Reviewed by: Glenn Hermes**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 2

Criterion Met? Yes: No: X

Criterion: Personnel planned to do this work have been identified. The plan should include personnel to perform vacuum vessel and tube assembly, vacuum system connections and operation, leak detection and vessel entry. The staffing plan will be used to verify training and qualification of personnel and identify any personnel who may need additional specific training for this work. The plan will also be used to verify that there are adequate personnel to perform this work safely and effectively.

Approach:

1) Documents and records review. Reviewed Jacobs Training, Qualification, and Certification of Commissioning Test Personnel (IMI-9.3) and a draft of LT Personnel Qualification and Certification for JFI at NIF and sample questions for ASNT standard for qualification of leak check Level II. Also review the available installation procedures (LB 16-19) and test procedures LT-002 and LT-101. Reviewed one resume for the Commissioning Test Engineer.
2) Personnel interviews. BIS Operations and Commissioning Manager
3) Walk-downs, inspections, observations of activities. N/A

Discussion of Results and Conclusion:

Jacobs has developed a detailed project level staffing and schedule plan. A specific plan listing the specific personnel required for this work is being developed. Currently only one person, the Commissioning Test Engineer, has been identified. He will function as the MSLT Level III for this work. His resume indicates he has the training and work experience required for this work. Other personnel functioning as Level II and Level I, required to perform this work, have not yet been identified.

At the time of this MPR, certification of the Commissioning Test Engineer for this work had not been completed by Jacobs.

The training and qualification processes used by Jacobs appears to be very detailed and through. Their process, when completely implemented for this work, should meet the requirements specified within CSP-16 and the NIF Construction Safety Plan.

The detailed staffing plan for this work still needs to be developed in order to verify training and qualification of personnel.

Are there any findings? If so, mark one: **Type A (pre-start): X** **Type B (post-start):**
Description: Currently only one person of the technical team required to perform this work has been identified. All technical members of the work team for vacuum testing need to be identified.
Recommended Corrective Action: All technical members of the work team for vacuum testing need to be identified. Their training (per the Jacobs training plan identified in section 17.0 of this MPR) needs to be completed and verified before work begins.

Review Item:	**Review Date: 3/13/01**
20 Environmental Permits	**Reviewed by: S. Brereton**
20.1 Effluent monitoring system	**FSD: N.L.1.2.2, N.L.1.2.4**
20.2 Environmental Documentation	**Page: 1 of 1**
20.3 Permits	

Criterion Met? Yes: ☐ **No:** ☐

N/A

Criterion:
The requirement to have environmental permits and documentation in place is not applicable to the beamline vacuum tests. It is expected that there will be no effluents from the tests, and thus, an effluent monitoring system is not required. Similarly, no environmental permits are needed (Note that wipe cleaning of components may be needed prior to performing the tests. Effluents from this operation are covered under permits S-2121 and S-2127. These effluents, however, are not directly attributed to the beamline vacuum testing, and therefore are not within the scope of this MPR). Environmental documentation for the construction of the NIF consists of the Project Specific Analysis for the National Ignition Facility, Appendix I of the Programmatic Environmental Impact Statement for Stockpile Stewardship and Management. No specific additional environmental documentation for the beamline vacuum tests is required.

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A
Type A (pre-start): ☐
Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item: **21.0 Other Requirements**	**Review Date: 3/27/01** **Reviewed by: Jeff Williams** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 1**

Criterion Met? Yes: ☐ **No:** ☐
N/A

Criterion: Other requirements that pertain to the commissioning and operation of the spatial filters have been identified by:

1) Reviewing the Design Basis Books, SDR002 and SSDR 1.4.1 and identifying other requirements of the CSF and TSF vacuum enclosures,
2) Reviewing CSP-16 and identifying other requirements of the installed, assembled CSF and TSF vacuum enclosures.

These requirements for vacuum operation of the spatial filters will be reviewed and validated as part of the LB2 Main Laser Commissioning MPR. Specifically, the spatial filters will:

1) Have actual lenses (SF1,2,3 &4) in place of the blank off plates used for this vacuum test,
2) Have glass injection windows installed in place of blank of plates used for this vacuum test,
3) Contain additional hardware, particularly in the center vessels, which will significantly contribute to the vacuum outgassing load,
4) Be attached to the vacuum system utilities, rather than the portable vacuum pumping system used for this test.

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A
Type A (pre-start): ☐
Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item:	**Review Date: 3/26/01**
22.0 Other Non-Conformance Closeout	**Reviewed by: Terry Bevers**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 2

Criterion Met? Yes: X No:

Criterion: The Status of OTHER Non-Conformance Reports such as Problem Reports from PICS data for the NIF Spatial Filter System was reviewed. All non-conformance issues were addressed, and there is no outstanding corrective action.

Approach:
1) A search of the PICS database was done for any information regarding the CSF/TSF Spatial Filter Assemblies.
2) A brief interview with the responsible contract administrator, coordinator, & engineer was conducted to identify any OTHER outstanding non-conformance issues.
3) If any PICS is not complete, establish action to close in a timely manner.

Discussion of Results and Conclusion:
The following Problem Records were retrieved and investigated: 2001-0183,-0180,-0179,-0178,-0088,-0065,-0062,-0032; 2000-0177,-0176,-0175,-0068,-0055,-0054,-0053,-0052,-0051,-0050,& -0042.

Most Problem Records had been closed or did not apply to the Vacuum Leak Check Process. Most unresolved problems were cleaning issues.

Records that did not apply were 2001-0183, -0180, -0179, -0178, & -0065.
Records that were closed were 2001-0088 & -0062 and 2000-0177.

One of the actions to close 2000-0042 was completed this week with the release and approval of the Addendum to MESN-98-011-0A. The design was changed to correctly support a glass window that was over stressed by excessive clamping loads and uneven bearing surfaces. Drawings have been changed for the support hardware and MESN-01-019 addresses these revisions. The only open items left prior to closure of this record are completion of MESN-01-034 that addresses the design of the Vessel Window material and methods to address unknown quantities of windows that have been installed and may have excessive clamping loads.

The balance of Records (2000-0176, -0175, -0055 thru –0050, & -0068) are still in progress and involve cleaning and packing damage issues. JFI will address this prior to or at installation. An LLNL Steering Committee is addressing the cleanliness specifications and cleaning requirements to hopefully reduce the level of cleaning, and thus, remove the nonconformance issues with most of the components.

The completed Problem Records meet the requirements of the LLNL ES&H and Mechanical Design Safety Standards and PCM Procedures 3.2, 7.4, & 7.5 Nonconformance Reporting, Procurement Planning, Scheduling, Review, and Approval, & Subcontract Administration respectively.

Are there any findings? If so, mark one: **Type A (pre-start):** ☐ **Type B (post-start):** **X**
Description: 1) Damaged packing material was noted on several vessels during the CSP-13 operations and PICS Records (2000-0175&176) were opened. Cleanliness deviations are unknown until all of the vessels are unwrapped at installation. 2) Many CSF/TSF Assembly components identified in Problem Records 2000-0050 thru –0055 & -0068 exceed particle size and NVR specifications. LLNL Steering Committee is trying to reduce the specification levels to accept most of these deviations.
Recommended Corrective Action: **1)** Further inspection of all damaged parts will be done at installation. JFI will clean all parts exceeding cleaning specifications per Specification NIF-50002441 as part of CSP-16 Installation requirements **2)** JFI will clean all nonconformance parts prior to or at Installation.

Review Item:	**Review Date: 3/25/01**
23.0 Other design review action items	**Reviewed by: Jeff Williams**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 1

Criterion Met? Yes: ☐ **No:** ☐ **N/A**

Criterion:
All other action items from final design and procurement reviews will have been resolved or else determined to have no impact on the vacuum test if not resolved

Approach:

N/A

Discussion of Results and Conclusion:
All action items from design and procurement reviews which affect the vacuum test are reviewed and discussed under Review Item 5.0.

Are there any findings? If so, mark one:
Type A (pre-start): ☐
Type B (post-start): ☐

Description:

N/A

Recommended Corrective Action:

N/A

Review Item:	**Review Date: 3/25/01**
24.0 Supporting Analysis	**Reviewed by: Terry Bevers**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 1

Criterion Met? Yes: X **No:** ☐

Criterion: The precision survey requirements for the Spatial Filter System were identified and the Installation Procedures are in place.

Approach:
1)Review 100% Title II Design Review, December 18, 1997, 2 Volumes.
2)Interview responsible engineer to verify understanding of Precision Survey Data requirements.
3)Review major component and installation drawings of the CSF & TSF Systems.
4)Review all Precision Survey Data information applicable to the Spatial Filter System design and installation and verify compliance to established LLNL Mechanical Engineering Policies and Procedures & Design Safety Standards.
5)Note any deficiencies and recommend any corrective action.

Discussion of Results and Conclusion:
After reviewing the requirements for the Precision Survey in NIF-5007159, NIF Clear Aperture, and verifying the design basis and drawing specifications, an interview with the responsible engineer was arranged.

During subsequent interviews it was explained that the top level clear aperture requirements flow down to various factors that contribute to clear aperture loss. The requirements flow down process was executed prior to CSP 13 in a series of working group meetings consisting of a wide range of NIF participants. The working group allocated tolerances to structure installation, LRU installation, survey network, and optic fabrication that are consistent with the clear aperture requirement. The resulting allocation is summarized in NIF-00-45450, Laser Bay Installation/Alignment Requirements. This document contains top level installation requirements for main laser vessels and structures.

The top level installation requirement for vessels and structures is the parent for detailed survey instructions provided in the CSP 13 and 16 contracts. The detailed survey instructions to the contractor consist of laser bay installation coordinates for precision survey features located on each vessel and structure, and laser bay installation tolerances for those features. The detailed instructions are contained in Excel spread sheet format referred to by the project as survey Form A's. The Form A sheets were reviewed and are complete.

In addition to detailed installation instructions to the CSP contractor, the Form A's contain blank columns the contractor must fill out with survey performance data as the installation work is completed. The Form A's, with survey performance data completed, are the contractors submittal

back to the project for acceptance of the work. Form A's have been completed through CSP-13 and returned to LLNL.

The CSP contractors submittal is reviewed by the NIF Precision Survey Group for quality assurance, who provide a written summary to contract authorities whether or not the installation work meets the requirements. The NIF Precision Survey Group has a note book documenting the analysis conducted for each contractor submittal. Results to-date indicate no major deficiencies.

A summary of integrated performance of main laser equipment survey installation work to date was recently published in Table II of NIF-0059923, Network Transition Plan Milestone. The table reports installation performance relative to the requirements. Results through CSP-13 only indicate small deviations that will not affect fit, form, or function. An NCR will be initiated at the completion of CSP-13 to summarize all deficiencies.

The Precision Survey Data and Installation Plans meet the requirements of LLNL Mechanical Engineering Policies and Procedures & Design Safety Standards.

Are there any findings? If so, mark one:
Type A (pre-start): ☐
Type B (post-start): **X**

Description:
Small deviations of survey data have been recorded, but not documented in an NCR. These nonconformance items will not affect fit, form, or function of the Vacuum Leak Test Process.

Recommended Corrective Action:
An NCR should be initiated at the end of work for CSP-13 and closed with acceptance of the insignificant deviations of survey data.

Review Item: **24.1 Engineering Calculations**	**Review Date: 3/25/01** **Reviewed by: Terry Bevers** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 2**

Criterion Met? Yes: X **No:** ☐

Criterion: Design requirements for additional subject matter that would lend confidence to the successful completion of the vacuum leak check were defined and Engineering Safety Notes are in place.

Approach:

1. Review 100% Title II Design Review, December 18, 1997, 2 Volumes, specifically the SDRs & SSDRs.
2. Interview responsible engineer to verify understanding of total requirements.
3. Review major component and installation drawings of the CSF & TSF Systems.
4. Review all Engineering Safety Notes applicable to the Spatial Filter System design and identify any required additional calculations. Seismic and Handling calculations are in existing ESNs.
5. Verify ESN compliance to established LLNL Mechanical Engineering Policies and Procedures & Design Safety Standards.
6. ESNs included in this review are MESN-98-010-0A , ("Spatial Filter Beam Tubes "), MESN-98-011-0A ("Spatial Filter Center Vessels"), & MESN-98-012-OA ("Spatial Filter End Vessels"), plus items identified in email of March 1, 2001 from Bill Collins that will be included in addenda to the original safety notes.
7. Review NIF Assessment Report 01-02, Laser Bay Concrete Pedestal.
8. Note any deficiencies and recommend any corrective action.

Discussion of Results and Conclusion:

The responsible engineer did identify one DR that did not have any follow up calculations done to verify that the original SF was not lowered beyond minimum requirements. Calculations were done using the reduced weld length and the SF was reduced from 9.0 to 8.33 still greater than the required 1.0 (Ref. MESN-98-010-0A, APP. Pg. A7

A review of the NIF Assessment Report 01-02, Laser Bay Concrete Pedestal was made (NIF 0063452), and there were no major technical concerns associated with the pedestal. Records reviewed as a part of this assessment included shop drawings, survey reports, submittals, change order documents, RFIs, correspondence, inspection reports, mill certifications, and miscellaneous records and memoranda.

All documents reviewed meet the requirements of LLNL Mechanical Engineering Policies and Procedures & Design Safety Standards.

Are there any findings? If so, mark one: **Type A (pre-start):** ☐ **Type B (post-start):** ☐
Description: No findings.
Recommended Corrective Action: None.

Review Item: **25. Final Drawings Complete**	**Review Date: 3/14/01** **Reviewed by: S. Brereton** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 1**
Criterion Met? Yes: ☐ **No:** ☐ N/A	
Criterion: The requirement to have completed final drawings is not applicable for the beamline vacuum tests. The final drawings for beamline systems are required for the LB2 Main Laser Commissioning MPR.	
Approach: N/A	
Discussion of Results and Conclusion: N/A	
Are there any findings? If so, mark one: N/A **Type A (pre-start):** ☐ **Type B (post-start):** ☐	
Description: N/A	
Recommended Corrective Action: N/A	

Review Item: **26. Maintenance Plan and Procedures**	**Review Date: 3/13/01** **Reviewed by: S. Brereton** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 1**

Criterion Met? Yes: ☐ **No:** ☐

N/A

Criterion: The requirement to have a maintenance plan and procedures is not applicable for the beamline vacuum tests. The beamline vacuum tests are a construction activity and are not part of sustained operations. Therefore they do not require a maintenance plan or procedures. A test plan/procedure and cleanliness control plan addresses the specifics of the beamline vacuum tests (see items 12 and 15).

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A

Type A (pre-start): ☐

Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item:	**Review Date: 3/13/01**
27. Operations Plan and Procedures	**Reviewed by: S. Brereton**
27.1 Chemtrack in place	**FSD: N.L.1.2.2, N.L.1.2.4**
27.2 Flow charts (logic & process)	**Page: 1 of 1**

Criterion Met? Yes: ☐ **No:** ☐

N/A

Criterion: The requirement to have an operations plan and procedures is not applicable for the beamline vacuum tests. The beamline vacuum tests are a construction activity and are not part of sustained operations. Therefore, they do not require an operations plan or procedures (including flow charts describing logic and processes). Since this is not a sustained operation, and since no chemicals will be used for the beamline vacuum tests, there is no need to implement Chemtrack. A test plan/procedure (including cleanliness control issues) addresses the specifics of the beamline vacuum tests (see review items 12.0 and 15.0).

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A

Type A (pre-start): ☐

Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item:	**Review Date: 3/14/01**
28. Assembly Refurbishment Plan **28.1 Flow charts (logic & process)** **28.2 Manufacturer's manuals or literature, other vendor submittals** **28.3 Replacement procedures** **28.4 Repair procedures** **28.5 Spares inventory and location** **28.6 Target chamber diagnostic construction guidelines**	**Reviewed by: S. Brereton** **FSD: N.L.1.2.2, N.L.1.2.4** **Page: 1 of 1**

Criterion Met? Yes: ☐ **No:** ☐
N/A

Criterion: The requirement to have an assembly refurbishment plan is not applicable for the beamline vacuum tests. The beamline vacuum tests are a construction activity and are not part of sustained assembly and refurbishment operations. Therefore, they do not require an assembly/refurbishment plan (including flow charts describing logic and processes, manufacturer's manuals/vendor submittals, replacement procedures, repair procedures, or spares inventory/location). Repair plans for high impact failures associated with the beamline vacuum tests are included in review item 10.2. This is not part of target chamber diagnostic construction and so those guidelines are not relevant.

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one:
Type A (pre-start): ☐
Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item:	**Review Date: 3/14/01**
29.0 Fire Protection and Life Safety	**Reviewed by: S. Brereton**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 1

Criterion Met? Yes: ☐ **No:** ☐

N/A

Criterion: The requirement related to fire protection and life safety systems is not applicable for the beamline vacuum tests. The scope of this MPR includes the vacuum testing only, and thus facility related items are not addressed.

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A

Type A (pre-start): ☐

Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item:	**Review Date: 3/14/01**
30.0 Facility Utilities (HVAC, cleanliness, electrical power, emergency power, phones, building page, etc.)	**Reviewed by: S. Brereton**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 1

Criterion Met? Yes: ☐ **No:** ☐

N/A

Criterion: The requirement related to facility utilities is not applicable for the beamline vacuum tests. The vacuum tests will use a temporary vacuum system, and will draw on facility electric power.

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A

Type A (pre-start): ☐

Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

Review Item:	**Review Date: 3/14/01**
31.0 Control and Logistic Systems (PLCs, ICCS, ERPs (Glovia), PDMS (Sherpa), etc.)	**Reviewed by: S. Brereton**
	FSD: N.L.1.2.2, N.L.1.2.4
	Page: 1 of 1

Criterion Met? Yes: ☐ **No:** ☐

N/A

Criterion: The requirement related to control and logistic systems is not applicable for the beamline vacuum tests. No specific control systems have been developed for use in the beamline vacuum tests. There are no critical equipment data acquisition or control systems that affect safety. Because this MPR addresses vacuum testing only, there is no need for component tracking (Glovia). These tests do not rely on PDMS (Sherpa).

Approach: N/A

Discussion of Results and Conclusion: N/A

Are there any findings? If so, mark one: N/A

Type A (pre-start): ☐

Type B (post-start): ☐

Description: N/A

Recommended Corrective Action: N/A

NIF-0063546
UCRL-ID-143148

APPENDIX 7.5 PICS ACTION ITEM RECORDS

	Action Item Record: 2001-0247	Page: 1

HEADER

Record No:	Priority	Status:
2001-0247	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	6/1/01	00/00/00

Title:
Beamline Vacuum MPR: Safety Documents

Description:
All procedures for the beamline vacuum testing have not been completed. The JHA has not been reviewed and approved. All the procedures and safety documents such as: JHA's, job specific lifting plan, LT-102 General Procedure for HMS-Leak Testing by the Tracer Probe Method, LT 202 HMS Leak Testing Procedure for Spatial Filter Bundles, and a procedure for Pressure Decay Testing, must be completed before the tests begin. This should include the review, approval and release of these documents before beginning any of the work. All procedures must meet the requirements specified within CSP-16 and associated engineering drawings. LLNL must review the procedures for reference to LLNL Engineering Safety Notes (ESN's) where applicable. ESN's often include specific methods and assumptions for assembly, installation, and operations. These items must be specifically included in these procedures. LLNL must also include a review of the Jacobs Verification Checklists for any NCR and ESN related issues.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0248	Page: 1

HEADER

Record No:	Priority	Status:
2001-0248	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	5/1/01	00/00/00

Title:
Beamline Vacuum MPR: Torque Wrench Calibration

Description:
Torque wrench calibration data was reviewed for one electronic data logging torque wrench made by Ingersoll Rand. Calibration was performed at the factory and sufficient data was present to confirm operation within designed tolerances. It is not known at this time whether other torque wrenches are to be used in CSF/TSF assembly work; however, calibration data for every torque wrench used in CSF/TSF assembly should be recorded in JFI's installation report. Additional verification should be performed on a daily basis (when the wrench is used) using a torque standard to confirm normal operation. The collection of calibration data including torque wrench serial number, calibration date and daily verification should be implemented in JFI's CSF/TSF installation procedures and reports prior to starting assembly activities. Provisions must be put in place to verify that torque wrenches used in CSF/TSF installation are calibrated.

RESOLUTION

Action Taken:

**** END OF REPORT ****

NIF	**Action Item Record: 2001-0249**	Page: 1

HEADER

Record No: 2001-0249	**Priority** 1	**Status:** In Work
Category: Action Tracking	**Identifier:** Williams, Jeff	**Owner:** Atherton, Jeff
Start Date: 3/28/01	**Due Date:** 6/1/01	**Complete Date:** 00/00/00

Title:
Beamline Vacuum MPR: MSLD Calibration

Description:
During MSLD leak measurements, the helium mass spectrometer leak detector is calibrated using two certified helium leak standards per CSP-16. JFI's Leak test report form for procedure LT-101 included provisions for recording the serial number and leak rate of these certified leaks. Leak test procedure LT-101 also includes steps for calibrating the leak detector before performing each leak measurement operation. A check of MSLD calibration is also made after each measurement. While JFI's test procedure addresses the issue of MSLD calibration, it doesn't yet include a check to verify that certified leaks have been calibrated within the past year. This step should be included in JFI's leak test procedure. Provision must be in place to verify that certification of calibrated leaks to be used to calibrate a MSLD are valid.

RESOLUTION

Action Taken:

**** END OF REPORT ****

NIF	**Action Item Record: 2001-0250**	Page: 1

HEADER

Record No: 2001-0250	**Priority** 1	**Status:** In Work
Category: Action Tracking	**Identifier:** Williams, Jeff	**Owner:** Atherton, Jeff
Start Date: 3/28/01	**Due Date:** 6/1/01	**Complete Date:** 00/00/00

Title:
Beamline Vacuum MPR: Pressure Gauge Calibration

Description:
During Pressurization of components with air, a pressure measuring device will be used to confirm pressurization to 2.5kPa. This gauge must be calibrated annually per CSP-16. Procedures for pressurization of components have not yet been reviewed to confirm collection of calibration data. Provisions must be in place to verify that the pressure gauge used to perform pressure-decay test measurements are calibrated.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0251	Page: 1

HEADER

Record No:	Priority	Status:
2001-0251	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	6/1/01	00/00/00

Title:
Beamline Vacuum MPR: Pressure Relief Device Calibration

Description:
Since the design is not complete, it has not been determined if the pressurization system will require a pressure relief device. If one is required, then provisions are not currently in place to verify that Pressure Relief Devices used to protect components from overpressurization during pressure-decay testing have been calibrated.

RESOLUTION

Action Taken:

** END OF REPORT **

	Action Item Record: 2001-0252	Page: 1

HEADER

Record No:	Priority	Status:
2001-0252	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	5/15/01	00/00/00

Title:
Beamline Vacuum MPR: Capacitance Manometer Calibration

Description:
A vacuum rate-of-rise test to be performed on CSF and TSF components is mandated by CSP-16. JFI test procedures do not yet implement this test, therefore it cannot be confirmed that data is collected nor calibration performed. During acceptance testing performed by component vendors, calibration of ionization gauges (hot filament or cold cathode) was not considered critical by LLNL witnesses because very large calibration errors in this pressure measurement are tolerable while still meeting beamline operational vacuum requirements. Pressure measurements (by capacitance manometer) for rate-of-rise test were considered critical. Calibration of this pressure measuring device must therefore be performed annually, a check inserted in the procedure to verify current calibration, and calibration data should be recorded on the test report form. Provisions must be in place to verify that the Capacitance Manometer used to make pressure measurements for the Rate-of-Rise test are calibrated.

RESOLUTION

Action Taken:

** END OF REPORT **

	Action Item Record: 2001-0253	Page: 1

HEADER

Record No:	Priority	Status:
2001-0253	2	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	5/1/01	00/00/00

Title:
Beamline Vacuum MPR: ECRs on Drawings

Description:
Outstanding ECRs exist for changes to drawings which do not effect the vacuum test. Outstanding ECRs must be tracked until complete.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0254	Page: 1

HEADER

Record No:	Priority	Status:
2001-0254	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	6/1/01	00/00/00

Title:
Beamline Vacuum MPR: Expected Failure Modes/Impact

Description:
Only a few expected failure modes have been identified and discussed. Specific safety related issues such as oxygen deficiency, elevated work and catastrophic failure of a beam tube during evacuation have been considered and identified in the JHA.

The only process related issue that has been identified at this point, is an unacceptable leak rate. In this event, per proced ure LT-101, "the operator must make the best judgement related to the circumstances." More detailed options should be discussed. Considerations to cleanliness and impact on further leak tests should be identified and discussed. Additional process issues such as potential operator error or power failure and their impact on safety and cleanliness should be reviewed. Additional expected failure modes such as a power failure or operator error should be identified and reviewed.

A more thorough review of expected failure modes and their impact should be conducted. Items and their controls should be identified and included in the appropriate test procedures.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0255	Page: 1

HEADER

Record No:	Priority	Status:
2001-0255	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	6/1/01	00/00/00

Title:
Beamline Vacuum MPR: Test Plan and Procedures

Description:
The entire set of test procedures and checklists for this work has not been completed. The required procedures and checklists must be completed prior to performing the tests, This includes review, approval, and release of these documents before the specific work begins. All procedures must meet the requirements specified within CSP-16 and associated engineering drawings. LLNL must review the procedures for reference to LLNL Engineering Safety Notes (ESN's) where applicable. ESN's often include specific methods and assumptions for assembly, installation, and operations. These items must be specifically included in these procedures. LLNL must also include a review of the Jacobs Verification Checklists for any NCR and ESN related issues.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0256	Page: 1

HEADER

Record No:	Priority	Status:
2001-0256	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	5/1/01	00/00/00

Title:
Beamline Vacuum MPR: Cleanliness Control Plan

Description:
The drafts of the general vacuum test procedures note the requirement to maintain cleanliness, but do not provide details or controls. Specific vacuum test procedures are still under development. Specific cleanliness requirements and controls should be included in these specific test procedures. Complete the specific vacuum test procedures, including requirements and controls for cleanliness. Review, approve and release these documents before beginning specific work.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0257	Page: 1

HEADER

Record No:	Priority	Status:
2001-0257	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	6/1/01	00/00/00

Title:
Beamline Vacuum MPR: Training Requirements and Verification

Description:
The Jacobs process for training and qualification is in place. Implementation of this process needs to be completed for beamline vacuum testing.

Personnel required to perform the vacuum tests need to be identified. Specific training and qualification for the vacuum testing, using the established Jacobs processes, needs to be completed and verified before specific work begins. This should include appropriate safety training for performing work at the NIF site.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0258	Page: 1

HEADER

Record No:	Priority	Status:
2001-0258	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	6/1/01	00/00/00

Title:
Beamline Vacuum MPR: Staffing Plan

Description:
Currently only one person of the technical team required to perform the beamline vacuum testing has been identified. All technical members of the work team for vacuum testing need to be identified. Their training (per the Jacobs training plan identified in section 17.0 of the Beamline Vacuum MPR) needs to be completed and verified before work begins.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0261	Page: 1

HEADER

Record No:	Priority	Status:
2001-0261	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	5/1/01	00/00/00

Title:
Beamline Vacuum MPR: Installation Plan and Procedures

Description:
The current versions of the installation procedures for this work are still in draft form. The installation procedures and a job specific lifting plan must be completed (including review, approval and release of these documents) before any of this work is started. All procedures must meet the requirements specified within CSP-16 and associated engineering drawings. LLNL must review the procedures for reference to LLNL Engineering Safety Notes (ESN's) where applicable. ESN's often include specific methods and assumptions for assembly, installation, and operations. These items must be specifically included in these procedures. LLNL must also include a review of the Installation Verification Checklists for any NCR and ESN related issues.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0262	Page: 1

HEADER

Record No:	Priority	Status:
2001-0262	2	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Van Wonterghem, Bruno
Start Date:	**Due Date:**	**Complete Date:**
3/28/01	3/31/02	00/00/00

Title:
Beamline Vacuum MPR: Safety Note Assumptions

Description:
The assumptions of loadings and use and analysis methods used in the ESN calculations should be consistent with the plans and procedures for commissioning and operations. The Main Laser Commissioning MPR should include a verification that commissioning plans and procedures and operations plans and procedures are consistent with the asuumptions of loadings and use and analysis methods used in the ESN calculations.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0263	Page: 1

HEADER

Record No:	Priority	Status:
2001-0263	1	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/29/01	5/1/01	00/00/00

Title:
Beamline Vacuum MPR: Window Safety Note

Description:
Problem Record 2000-0042 identified window breakage due to a design flaw. The window support system was redesigned to assure stresses in the window would not exceed 500 psi. MESN-01-034 is in progress to validate the window design. The redesigned Window Assemblies will be installed by JFI at Installation, CSP-16. MESN-01-034 must be completed prior to installation and leak checks of the windows.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0265	Page: 1

HEADER

Record No:	Priority	Status:
2001-0265	2	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/29/01	5/1/01	00/00/00

Title:
Beamline Vacuum MPR: Cleanliness Deviations

Description:
Damaged packing material was noted on several vessels during the CSP-13 operations and PICS Records (2000-0175&176) were opened. Cleanliness deviations are unknown until all of the vessels are unwrapped at installation. Further inspection of all damaged parts will be done at installation. JFI will clean all parts exceeding cleaning specifications per Specification NIF-50002441 as part of CSP-16 Installation requirements.

Many CSF/TSF Assembly components identified in Problem Records 2000-0050 thru –0055 & -0068 exceed particle size and NVR specifications. LLNL Steering Committee is trying to reduce the specification levels to accept most of these deviations. JFI will clean all nonconformance parts prior to, or at, Installation.

RESOLUTION

Action Taken:

**** END OF REPORT ****

	Action Item Record: 2001-0266	Page: 1

HEADER

Record No:	Priority	Status:
2001-0266	2	In Work
Category:	**Identifier:**	**Owner:**
Action Tracking	Williams, Jeff	Atherton, Jeff
Start Date:	**Due Date:**	**Complete Date:**
3/29/01	5/1/01	00/00/00

Title:
Beamline Vacuum MPR: Survey Data Deviations

Description:
Small deviations of survey data have been recorded, but not documented in an NCR. An NCR should be initiated at the end of work for CSP-13 and closed with acceptance of the insignificant deviations of survey data.

RESOLUTION

Action Taken:

**** END OF REPORT ****